

IN THE CLAIMS:

Please add new claims 57-126 and cancel claims 1-19, 21-34, and 37-56 without prejudice or disclaimer.

1-19 (Canceled)

20. (Currently amended) A method of transposon-mediated mutagenesis in a *C. elegans* genome, comprising ~~the steps of~~:

- a. introducing a transgene construct into the *C. elegans* genome, wherein the construct comprises a transposase gene which is operably linked to a regulable expression control element and a 3' untranslated region of a gene that is expressed in the *C. elegans* germline; and
- b. expressing the transposase gene, such that a transposon in the *C. elegans* genome transposes, causing a mutation.

21-34 (Canceled)

35. (Original) The method of Claim 20, wherein the transposons comprise heterologous transposons.

36. (Original) The method of Claim 35, wherein the heterologous transposons are introduced in the *C. elegans* genome.

37-56 Canceled)

57. (New) A method of inducing transposition in a *C. elegans* organism, said method comprising:

introducing into a *C. elegans* organism a transposase gene operably linked to an expression control element and having an artificial intron in said transposase gene;

expressing said transposase gene to produce a transposase; and
inducing transposition of a transposon by said transposase in said *C. elegans* organism.

58. (New) The method according to claim 57, wherein said expression control element comprises an inducible promoter.
59. (New) The method according to claim 57, wherein expressing said transposase occurs during germline development in said *C. elegans* organism.
60. (New) The method according to claim 57, wherein said expression control element is selected from the group consisting of a *ced-9* promoter, a *glh-2* promoter, a *myo-3* promoter and a *hsp-16-48* promoter.
61. (New) The method according to claim 57, wherein said transposon is a heterologous transposon.
62. (New) The method according to claim 61, wherein said heterologous transposon is selected from the group consisting of *Mos-1* or *Autmar*.
63. (New) The method according to claim 61, wherein said heterologous transposon comprises a gene for selecting or screening of said *C. elegans* organism.
64. (New) The method according to claim 61, further comprising introducing a FRT recombination site in said heterologous transposon.
65. (New) The method according to claim 61, further comprising introducing a gene encoding a FLP recombinase in said heterologous transposon.

66. (New) The method according to claim 61, further comprising introducing a selectable marker with said transposase gene.
67. (New) The method according to claim 61, wherein said expression control element comprises a heat shock promoter.
68. (New) The method according to claim 57, wherein said transposase gene is a TC3A transposase gene.
69. (New) The method according to claim 61, wherein expressing said transposase gene comprises expressing a *Mos* or *Himar1* transposase gene.
70. (New) The method according to claim 57, wherein said expression control element comprises a *glh-2* promoter and a *glh-2* 3' untranslated region.
71. (New) The method according to claim 70, further comprising expressing said transposase in a germline cell of said *C. elegans* organism.
72. (New) The method according to claim 59, wherein said expression control element comprises a *glh-2* promoter and a *glh-2* 3' untranslated region.
73. (New) The method according to claim 59, further comprising introducing a genomic sequence into said *C. elegans* organism with said transposase gene.
74. (New) The method according to claim 61, further comprising introducing said transposon into said *C. elegans* organism.
75. (New) The method according to claim 57, further comprising reducing tandem repeats in an array comprising said transposase gene.

76. (New) The method according to claim 75, wherein said array is integrated.
77. (New) A method of inducing transposition of a heterologous transposon in a *C. elegans* organism, said method comprising:
- introducing a transposase gene operably linked to an expression control element into a *C. elegans* organism;
 - introducing a heterologous transposon into said *C. elegans* organism;
 - expressing said transposase gene to produce a transposase; and
 - inducing transposition of said heterologous transposon by said transposase in said *C. elegans* organism.
78. (New) The method according to claim 77, further comprising reducing tandem repeats in an array comprising said transposase gene.
79. (New) The method according to claim 78, wherein said array is integrated.
80. (New) The method according to claim 77, wherein said expression control element comprises an inducible promoter.
81. (New) The method according to claim 80, wherein said expression control element comprises a heat shock promoter.
82. (New) The method according to claim 77, wherein expressing said transposase gene in said *C. elegans* organism occurs during germline development in said *C. elegans* organism.
83. (New) The method according to claim 77, further comprising engineering said transposase gene to allow efficient expression in *C. elegans*.

84. (New) The method according to claim 83, wherein engineering said transposase gene to allow efficient expression in *C. elegans* comprises introducing an artificial intron in said transposase gene.
85. (New) The method according to claim 77, wherein said expression control element is selected from the group consisting of a *ced-9* promoter, a *glh-2* promoter, a *myo-3* promoter and a *hsp-16-48* promoter.
86. (New) The method according to claim 82, wherein said expression control element comprises a promoter selected from the group consisting of *ced-9*, *glh-2* and *hsp-16-48*.
87. (New) The method according to claim 82, wherein said expression control element comprises a heat shock promoter.
88. (New) The method according to claim 77, wherein introducing a transposase gene further comprises producing an integrated array in said *C. elegans*.
89. (New) The method according to claim 77, further comprising introducing a FRT recombination site in said heterologous transposon.
90. (New) The method according to claim 77, further comprising introducing a gene encoding a FLP recombinase in said heterologous transposon.
91. (New) The method according to claim 77, wherein said heterologous transposon comprises a gene for selecting or screening of said *C. elegans* organism.
92. (New) The method according to claim 77, wherein said heterologous transposon is selected from the group consisting of *Mos-1* or *Autmar*.

93. (New) The method according to claim 77, wherein expressing said transposase gene comprises expressing a *Mos* or *Himar1* transposase gene.
94. (New) A method of inducing transposition in a *C. elegans* organism, said method comprising:
- introducing a transposase gene operably linked to an expression control element into a *C. elegans* organism;
 - expressing said transposase gene in a germline cell to produce a transposase; and
 - inducing transposition of a transposon by said transposase in said *C. elegans* organism.
95. (New) The method according to claim 94, wherein said expression control element comprises an inducible promoter.
96. (New) The method according to claim 94, wherein said expression control element is selected from the group consisting of a *ced-9* promoter, a *glh-2* promoter, a *myo-3* promoter and a *hsp-16-48* promoter.
97. (New) The method according to claim 96, wherein said expression control element comprises a *glh-2* promoter.
98. (New) The method according to claim 97, wherein said expression control element further comprises a *glh-2* 3' untranslated region.
99. (New) The method according to claim 98, further comprising reducing tandem repeats in an array comprising said transposase gene.
100. (New) The method according to claim 94, wherein said transposon is a heterologous transposon.

- 101.(New) The method according to claim 100, wherein said heterologous transposon is a *Mos-1* or *Autmar* transposon.
- 102.(New) The method according to claim 100, wherein expressing said transposase gene in a germline cell comprises expressing a *Mos* or *Himar1* transposase.
103. (New) The method according to claim 101, wherein said heterologous transposon comprises a gene for selecting or screening of said *C. elegans* organism.
104. (New) The method according to claim 101, wherein said expression control element comprises a heat shock promoter.
105. (New) The method according to claim 94, wherein said transposase gene is a TC3A transposase gene.
106. (New) The method according to claim 94, wherein introducing a transposase gene operably linked to an expression control element into a *C. elegans* organism further comprises integrating an array.
107. (New) The method according to claim 94, further comprising introducing a FRT recombination site in said heterologous transposon.
108. (New) The method according to claim 94, further comprising introducing a gene encoding a FLP recombinase in said heterologous transposon.
109. (New) The method according to claim 94, further comprising engineering said transposase gene to allow efficient expression in said *C. elegans* organism.

110. (New) The method according to claim 109, wherein engineering said transposase gene to allow efficient expression in said *C. elegans* organism comprises, introducing an artificial intron in said transposase gene.
111. (New) A transgenic nematode comprising:
a transposase gene operably linked to an expression control element,
wherein said transposase gene is capable of expression in a germline cell of a nematode.
112. (New) The transgenic nematode of claim 111, further comprising a heterologous transposon.
113. (New) The transgenic nematode of claim 112, wherein said heterologous transposon is a *Mos-1* or *Autmar* transposon.
114. (New) The transgenic nematode of claim 112, wherein said transposase gene is a *Mos* or *Himar1* transposase.
115. (New) The transgenic nematode of claim 112, wherein said transposase gene has an artificial intron.
116. (New) The transgenic nematode of claim 114, wherein said expression control element comprises an inducible promoter.
117. (New) The transgenic nematode of claim 111, wherein said transposase gene has an artificial intron.
118. (New) The transgenic nematode of claim 111, wherein said expression control element comprises an inducible promoter.

119. (New) A system for transposition in nematodes, comprising:
- a heritable transposase gene operably linked to an expression control element, wherein said transposase gene is capable of being expressed in a germline cell of a nematode;
 - a selectable marker linked to said heritable transposase gene; and
 - a transposon capable of transposing in response to expression of said transposase gene.
120. (New) The system for transposition in nematodes of claim 119, wherein said transposon is a heterologous transposon.
121. (New) The system for transposition in nematodes of claim 120, wherein said heritable transposase gene includes an artificial intron.
122. (New) The system for transposition in nematodes of claim 119, wherein said heritable transposase gene includes an artificial intron.
123. (New) The system for transposition in nematodes of claim 119, wherein said expression control element includes an inducible promoter.
124. (New) The system for transposition in nematodes of claim 120, wherein said transposase gene is in a first nematode and said heterologous transposon is in a second nematode, wherein said heterologous transposon is a heritable and said second nematode is capable of sexual reproduction with said first nematode.
125. (New) The system for transposition in nematodes of claim 124, wherein an F1 offspring of said sexual reproduction is identified as having said transposase gene and said heterologous transposon.

126. (New) The system for transposition in nematodes of claim 125, wherein said transposase gene is expressed in said F1 offspring.